

The ***Kentucky Environmental Quality Commission*** is a seven-member citizen board with the mission to:

- ◆ Facilitate public discussion and resolution of environmental issues,
- ◆ Monitor environmental trends and conditions, and
- ◆ Promote cooperative partnerships to protect and preserve the environment for generations to come.

The Commission also serves as an advisory body to the Governor and the Kentucky Natural Resources and Environmental Protection Cabinet on all environmental matters.

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Introduction

"If children are to keep their inborn sense of wonder...they need the companionship of at least one adult who can share it, rediscovering with them the joy, excitement, and mystery of the world we live in."

Rachel Carson, author of Silent Spring.

What is the "Teacher's Guide to Kentucky's Environment?"

This "Teacher's Guide" is a companion to the "State of Kentucky's Environment: A Report of Progress and Problems" that was published by the Kentucky Environmental Quality Commission in 1992. The "State of Kentucky's Environment" report is the first comprehensive review of environmental and natural resource conditions and trends in Kentucky.

The report provides statewide, regional, and local information for major topics including water resources, air quality, hazardous and solid wastes, toxics, agriculture, forestry, natural areas, fish and wildlife, threatened and endangered species, coal mining, and energy.

The report represents the first opportunity for Kentuckians to view environmental conditions and problems that impact their community in a holistic manner. This information can be used to support strategies for cleaning up existing environmental problems, preventing new ones from occurring, and for evaluating the effectiveness of our environmental protection programs and investments.

Kentucky has made much progress in cleaning up the environment, but we still have much more to do to make our rivers and streams swimmable and fishable, our air healthy to breathe, and our natural resources sustainable.

The Environmental Quality Commission, with the assistance of many educational experts, designed this "Teacher's Guide" to help educators use the "State of Kentucky's Environment" report to engage students in real world issues. In national polls, the majority of young people today say they consider environmental issues to be one of the most pressing concerns for their generation. The "State of Kentucky's Environment" report indicates their concerns are well-founded.

This guide incorporates information from the report into a framework designed to meet the mandates of the Kentucky Education Reform Act through activity-based learning experiences. It is the Commission's hope that this guide will help provide a foundation upon which young people can build the skills and acquire the information necessary to meet the tough environmental challenges facing our world and communities today and tomorrow.

The Commission wishes you success and encourages you to work with your students to establish environmental goals for their homes, schools, and communities. Your efforts and dedication will help Kentucky's young people develop an environmental ethic that fosters a lifelong commitment to appreciating and preserving the wealth of natural resources which have been entrusted to our care.

How to Use This Guide

This guide is intended to be used with middle and high school students. It contains activities that will provide your students the opportunity to learn about current environmental issues in their communities. The activities included are just an example of the many ways the "State of Kentucky's Environment" report can be used as an educational tool. You are encouraged to consider other creative learning activities and to share your successes with other teachers as well as with the Commission.

Activities have been assembled for each of the report's chapters: water resources, air quality, waste management, natural resources, toxics, coal mining, and energy. Each topic area includes a teacher's introduction to the subject area. KERA goals and learner outcomes for each activity appear on pages 1-2 in the Appendix of this guide.

Each chapter opens with a teacher's introduction that reviews the topic and the activities. The activities are flexible enough to allow you to adapt them to fit your needs. Instructions and student worksheets are provided for each activity.

The instruction sheets and student worksheets are designed to be copied, distributed, and reviewed with your students. The instruction sheets contain "Do You Know" questions to spark quick interest, a brief introduction, purpose, procedure, a list of other activities that can be included, and additional resources.

The worksheets include an overview of the issue and thought-provoking questions linked to the information presented. The worksheets can serve as stand-alone activities, or can be followed-up with activities included on the instruction sheet as Part II, Part III, etc. The additional activities further challenge students with “hands on” and “minds on” learning situations should you or your students wish to explore a subject area further.

Not only will these activities inform and develop skills and values, but they have also been crafted to inspire students to apply the knowledge they have acquired to real-world situations in their homes, classrooms, and communities. We have emphasized action that will enable students to engage directly in reducing environmental problems and preventing new ones.

The Kentucky Education Reform Act mandates a transition in educational strategies to activity-based teaching techniques. Educators who achieve success will be those who provide activities that are interesting and related to subjects about which the students are concerned. Educators who are experienced with environmental learning activities confirm that environmental education is an effective way to achieve the goals of KERA while encouraging students to become better stewards of our land, water, and natural resources.

In addition to the resources listed at the end of the instructions for each activity, the following general references offer educational materials and other resources you may find useful:

◆ *Environmental Resource Guide 1993-94*, Kentucky Association for Environmental Education. The document includes an annotated list of 223 organizations and agencies in Kentucky and at the national level that offer environmental education resources for educators. Contact Fife Wicks, Business Manager, 3200 Tucker Station Rd., Louisville, Ky. 40299, phone 502-267-8919 to obtain a copy.

◆ *Environmental Education Materials for Teachers and Young People (Grades K-12)*, U.S. Environmental Protection Agency, Office of External Affairs (A-108) Washington D.C. 20460, August 1988 OPA 87-022, 202-260-2080. The document includes an annotated list of materials and other resources, most of which are available at a nominal cost.

◆ *Environmental Hazards in Your School, A Resource Handbook*. U.S. Environmental Protection Agency publication # 2DT-2001, October 1990. The document includes an in-depth review of environmental hazards commonly found in schools and suggestions for addressing related problems. The booklet also includes a comprehensive list of contacts in each topic area. Contact the U.S. EPA Publications office at 202-260-2080 to obtain a copy.

◆ *The Video Project, Films and Videos for a Sustainable World, Catalog 93*. The Video Project, 5332 College Avenue Suite 101, Oakland CA 94618, 1-800-475-2638. The catalog includes a list of videos and films regarding global environmental issues and other related international concerns such as poverty, politics, human rights, and world peace.

◆ *Teacher's Guide to World Resources 1992-93, Comprehensive Coursework on the Global Environment*. World Resources Institute, 1709 New York Avenue, N.W., Washington D.C. 20006, 202-638-6300. This guide is a companion to the Institute's publication *World Resources 1992-93*, a report of global environmental trends.

◆ *A Guidebook To Excellence-A Directory of Federal Facilities and Other Resources for Mathematics and Science Education Improvement*. Office of Science and Technical Information, P.O. Box 62, Oak Ridge, TN 37831, 615-576-8401. This publication gives students, teachers, and parents a comprehensive list of educational resources in their local area and throughout the nation, including laboratories and other facilities that sponsor science and mathematics initiatives.

◆ Kentucky Natural Resources and Environmental Protection Cabinet, Office of Communications and Community Affairs, 4th Floor Capital Plaza Tower, Frankfort, Ky. 40601, 502-564-5525 offers environmental education materials and coordinates related activities for the Cabinet's various departments. The office has a school-based program called SEEK-Students Exploring the Environment in Kentucky. Contact the office for more information.

Environmental Education and the Goals of Education:

The State of Kentucky's Environment and School Reform

Dear Educator,

Governor Brereton Jones in his introduction to the Environmental Quality Commission's *"State of Kentucky's Environment"* report indicated that while Kentucky has enjoyed significant progress in environmental protection in recent years, there is much yet to be done. At least a third of our rivers, streams, and lakes are polluted to the extent that they cannot be used for fishing, swimming, or as sources of drinking water.

There is some contamination of groundwater in virtually every one of our 120 counties. We have well over a dozen counties that fall short of federal air quality standards for ozone pollution. We need to find better ways to deal with the four million tons of municipal waste generated each year in Kentucky.

We have lost 82 percent of the wetlands we once had and have only a few hundred of the two million acres of prairie land that once existed here. We have more than 300 plant species and more than 200 animal species considered threatened, endangered or of special concern. Helter-skelter development and unplanned urban growth will continue to be a serious issue for a long time to come. And the list goes on.

In a world full of intractable problems, it is always nice to be able to tackle two or more major challenges at the same time. Kentucky currently faces the implementation of school reform as well as the need to educate the next generation about the importance of the environment. The *"State of Kentucky's Environment: A Report of Progress and Problems"* offers a means by which the latter can be used to achieve the former. The Teachers' Guide is also designed to help teachers use the *"State of Kentucky's Environment"* to accomplish many of the most important contemporary goals of education in Kentucky.

The match-up between environmental education and the principle goals of school reform in Kentucky is impressive:

Develop student's ability to use basic communication and math skills for purposes and situations similar to what they will encounter in life.

The environment, and problems having to do with the environment, will be encountered in the lives of all students. The environment as subject matter offers unlimited opportunities to apply communication and mathematical skills to real-world problems.

Develop student's ability to apply core concepts and principles from mathematics, the sciences, the humanities, the social studies, and practical living studies to situations or problems similar to what they will encounter in life.

The environment and problems of the environment offer a relevant contemporary matrix that allow students to apply the basic sciences, the social sciences, mathematics, and the humanities - all at the same time - to the consideration and solution of real problems and situations in the students' homes, communities, regions, and state.

Develop student's ability to become a self-sufficient individual (making decisions based on ethical values, learning on one's own, developing resourcefulness and creativity).

No area is in greater need of resourcefulness and creativity than the world's environmental problems. Exercises based on "State of Kentucky's Environment" can be used to allow students to refine these skills and to connect learning to citizenship directly.

Develop students ability to become a responsible member of family, work group, and community.

Perhaps one of the things we now fail to do in educating citizens is to help them discover that they are in control in our society. Leading students through a consideration of local environmental issues, perhaps even extending this to the involvement of students in solving them, can obviously be an effective way of helping students realize that they can make a difference - that they have power as citizens.

Develop student's ability to think and solve problems both in school situations and in a variety of situations similar to what they will encounter in life.

Not only are there many environmental problems and issues being addressed in the media every day, environmental problems and considerations will continue to be among the most important set of problems to be solved by the people of the future.

Develop student's ability to connect and integrate experiences and new knowledge from all subject matter fields into their own existing knowledge base.

Ecology is the integrative discipline of the sciences and environmental science could easily be called the integrative discipline of all disciplines. Tackling and solving environmental problems require knowledge and perspectives from history, economics, biology, chemistry, physics, and the social sciences - and even the aesthetic disciplines, as well as the basic skills of mathematics, writing, and speaking. Contemporary environmental problems tie all of these together to the very real problems appearing in the newspapers every day!

If we are to deal with our environmental problems effectively in the future, we will need environmentally educated citizens. The responsibility of providing this education is one of the most important challenges facing teachers. The "*Teacher's Guide to Kentucky's Environment*" is intended to help teachers accomplish this task.

The ideas presented here are intended to serve as only a sample of the kinds of things teachers can do to connect the processes of maturation and learning in Kentucky's school children to the real-world issues and problems identified in the "*State of Kentucky's Environment*" report. Our hope is that creative teachers throughout the Commonwealth will find more and even better ways to make learning come alive and at the same time build appropriate environmental values into the generations of leaders to come.

Charles Kupchella, Environmental Educator

Dr. Kupchella, former Dean of the Ogden School of Science and Technology at Western Kentucky University, has provided years of leadership in Kentucky, and at the national and international levels, in the area of environmental education. Dr. Kupchella is now the Provost for Missouri State University Southeast, Cape Girardeau, Missouri.